

DOD Basic Research Rises 13 Percent; Congress Allocates \$9.4 Billion for S&T

(This analysis is part of a series of AAAS R&D Funding Updates on the FY 2001 congressional appropriations process. This analysis includes information on R&D in the House-Senate conference report for DOD appropriations. The complete series of AAAS R&D Funding Updates, including continually updated analyses of R&D by agency in FY 2001 appropriations, is available on the AAAS R&D Web Site (<http://www.aaas.org/spp/R&D>) in the “FY 2001 R&D” or the “What’s New” sections.)

Congress is ready to send to President Clinton a final FY 2001 Defense appropriations bill providing substantial increases for Department of Defense (DOD) R&D. On July 17, a House-Senate conference committee released a conference report (final version) of the Defense appropriations bill (HR 4576) reconciling differences between the House and Senate versions of the bill. The final Defense bill adds even more money to the substantial increases contained in the House and Senate bills for most DOD R&D programs, in contrast to the cuts requested by the Pentagon and the Clinton Administration. Assuming that the Senate approves and the President signs the bill, both of which are likely, **DOD’s R&D in FY 2001 will total \$41.9 billion**, \$3.4 billion more than the President’s request and \$2.6 billion or 6.6 percent more than FY 2000 (see Tables A and B). [The Senate approved the conference report on July 27, and President Clinton signed the bill into law on August 9.]

The final Defense bill boosts DOD funding of basic research (“6.1”) by \$152 million or 13.1 percent to \$1.3 billion. The final increase is above the House proposed increase of 11.5 percent and the Senate proposal of 10.5 percent. Applied research (“6.2”) also increases substantially by 7.9 percent to \$3.7 billion. Including DOD’s medical research programs, **DOD S&T** [(“6.1” through “6.3” programs, representing DOD’s investment in basic and applied research and technology development, plus medical research contained in other accounts)] will increase by 8.3 percent to \$9.4 billion, considerably more than the requested level of \$7.6 billion.

The final Defense bill contains substantial increases for the overall DOD budget as well as for R&D programs, increases even larger than those proposed by the President in February. The \$288 billion total for the final Defense bill, which funds most but not all of DOD, is \$4 billion more than the request and more than \$20 billion above the FY 2000 funding level. Military health care, procurement, and operations and maintenance accounts are the top priorities for Congress in the Defense bill, and receive even larger increases than the R&D programs.

The final Defense bill provides large increases for most **basic research (“6.1”)** accounts. DOD requested a 4.9 percent increase for “6.1” but the Senate responded with a 10.5 percent increase, and the House went even higher with a 11.5 percent increase. The final bill goes higher still with an appropriation of \$1.3 billion, 13.1 percent or \$152 million more than FY 2000 (see Table A). Although there will be a slight cut in Air Force basic research (down 1.2 percent to \$211 million), Navy basic research (up 5.1 percent to \$393 million) and Army basic research (up 2.8 percent to \$210 million) will increase. (All figures in this analysis are adjusted to reflect rescissions and general reductions of approximately 1 percent across the board. Before the reductions, for example, Air Force basic research would have been even with FY 2000). The largest increase will go to “6.1” in the Defense Agencies (DA), which will jump 35.3 percent to \$498 million. Within DA “6.1,” University Research Initiatives will increase from \$224 million to \$292 million to fund university-based projects, including more than a dozen congressionally designated projects, across a broad range of science and engineering disciplines. In recent years, the Senate has proposed large increases to “6.1” while the

House has appropriated smaller increases or cuts, and final appropriations have generally split the difference. But this year’s House-proposed increase was a departure from the recent pattern, and the final Defense bill also breaks from pattern by going above both the House and the Senate.

The **applied research** (“6.2”) accounts total \$3.7 billion in the final bill, nearly 8 percent above the FY 2000 funding level. As a result, total DOD support of research (basic plus applied) will be \$5.0 billion (up 9.2 percent), the largest increase in more than a decade, compared to a requested cut.

The “6.1” and “6.2” research accounts provide a significant share of federal support for several **key scientific and engineering disciplines**. DOD provides nearly a third of all federal support for engineering research, and a majority of federal support for some key engineering subfields. DOD also provides more than 40 percent of total federal support for computer sciences research, and plays a strong funding role in other disciplines such as mathematics, oceanography, medical sciences, chemistry, physics, and environmental sciences.

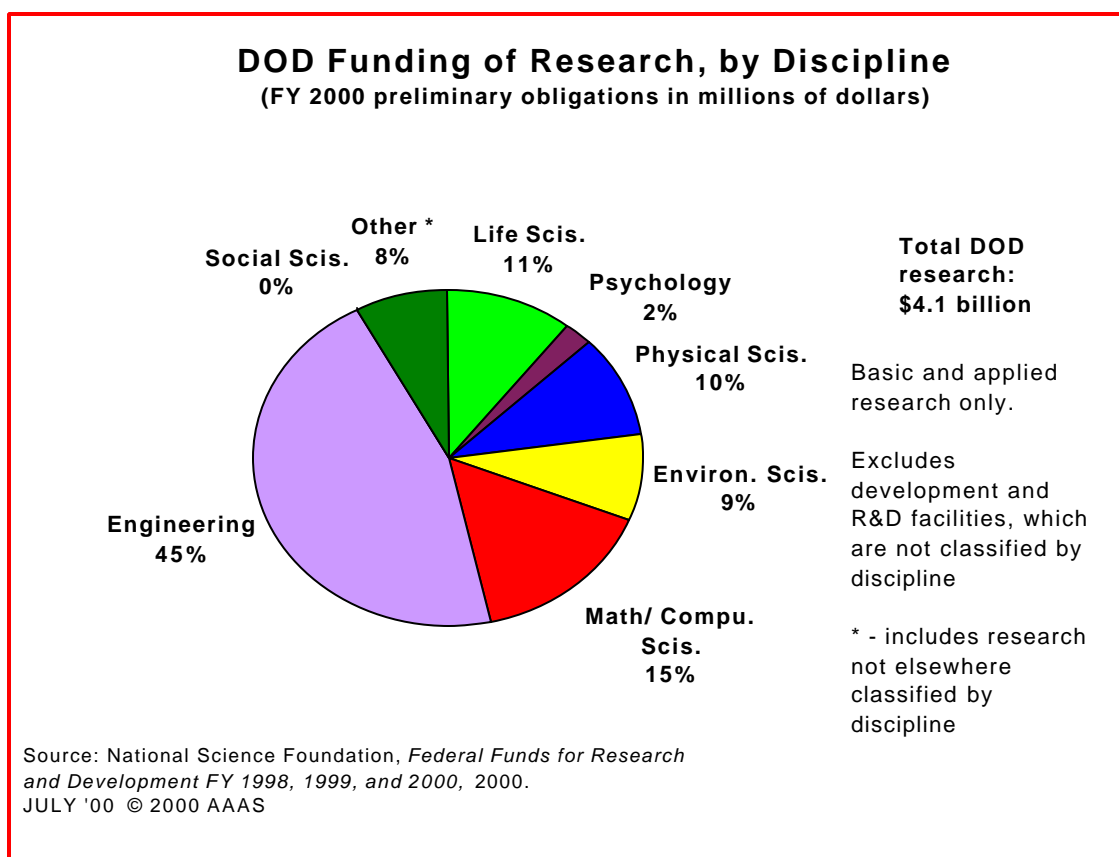


Figure 1.

DOD’s research portfolio by science and engineering discipline is shown in Figure 1. Because of DOD’s national security mission, the portfolio is weighted toward disciplines such as engineering, mathematics, physics, and computer sciences which have relevance to future weapons systems, but DOD also supports research in other fields for national security reasons, including the life sciences to combat bioterrorism threats and to ensure healthy solidiers, and environmental sciences (chiefly oceanography) to assist the Navy in operating its ships.

The “6.1” and “6.2” accounts are especially important for the nation’s **colleges and universities**, which perform more than half of “6.1” research and roughly 20 percent of “6.2” research. DOD is the third largest sponsor of federal R&D at colleges and universities, behind only the National Institutes of Health and the

National Science Foundation. DOD's impact, however, is concentrated in several key fields, shown in Figure 2 below. DOD provides a tenth of federal support for academic R&D, but more than half of all federal support for mechanical engineering and electrical engineering at universities, and nearly half of all federal support for computer sciences and materials engineering. The FY 2001 increases for "6.1" and "6.2" should boost DOD support for academic R&D in FY 2001, which has declined significantly in recent years due to cuts in the mid- to late 1990s in these accounts.

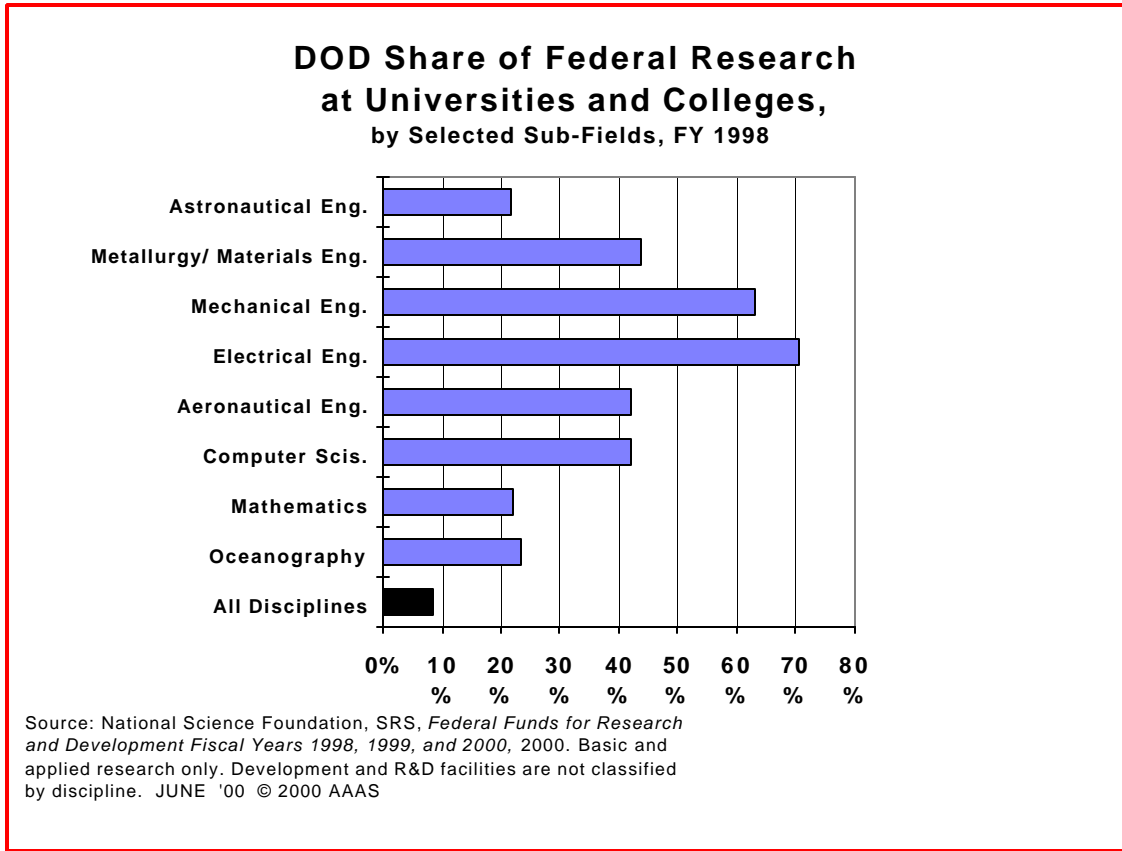


Figure 2.

The final Defense bill contains a separate \$349 million appropriation, outside the regular R&D accounts, for **congressionally designated medical R&D** (see Table A) plus another \$66 million for medical care-related information technology development for a total of \$415 million. This appropriation for peer-reviewed, competitively awarded research grants continues the recent expansion of DOD's effort in medical research. The final bill divides the \$349 million medical R&D total into \$175 million for breast cancer research (up from \$172 million in FY 2000), \$100 million for prostate cancer research (up from \$74 million), \$12 million for ovarian cancer research, \$6 million for other cancer research, and more than \$50 million for peer reviewed medical research on other topics. The Defense bill also contains numerous congressionally designated medical research in DOD's regular accounts, mostly in the Army and Navy, including R&D on HIV, alcoholism, neuroscience, bone marrow disease, Gulf War illness, and funding for medical laboratory facilities around the nation. Counting these appropriations, the Defense bill provides nearly \$750 million for congressionally designated medical research projects.

The "6.1," "6.2," and "6.3" categories are often grouped together as **"Science and Technology" (S&T)**. This category encompasses basic research, applied research, and advanced technology development, which contribute to a broad knowledge base with potential applications to a wide variety of military as well as civilian uses. S&T is separate from the "6.4" and higher categories, which are focused on the development and testing of specific weapons systems. DOD S&T declined steeply in the 1990s, but in FY 2000 DOD S&T,

including the medical research appropriations formerly appropriated within the “6.3” category, exceeded \$8 billion for the first time since FY 1994 thanks to strong congressional support for an appropriation of \$8.7 billion. Many science and technology organizations and defense observers called on DOD to maintain S&T funding at a minimum of \$8 billion in 2000 dollars, but the Pentagon requested only \$7.6 billion for S&T in FY 2001. **The final Defense bill far exceeds the request to bring S&T to \$9.4 billion**, up 8.3 percent from FY 2000. [This total includes medical research outside the regular “6.1” through “6.3” categories.]

Among the Defense Agencies, **the Defense Advanced Research Projects Agency (DARPA) will receive \$2.0 billion in FY 2001 (up 6.7 percent; see Table B)**. Most DARPA programs that are high priorities for the Administration will receive increases, although not as large as requested. Extensible Information Systems, a key program in the Administration’s Information Technology initiative on fundamental IT research, will see its funding rise from \$30 million to \$53 million, though this falls short of the request for \$69 million. Computing Systems and Communications Technology, another IT initiative component, falls short of the \$377 million request but will still rise from \$321 million in FY 2000 to \$334 million in FY 2001. Congress added to the request for Biological Warfare Defense, a program that funds R&D aimed at countering bioterrorism threats, and FY 2001 funding will be \$168 million, up from \$132 million.

The **Ballistic Missile Defense Organization’s (BMDO)** budget will also increase substantially, by 22.7 percent to \$4.2 billion. The BMDO appropriation funds continued development and testing of national and theater missile defense systems, including \$1.9 billion for development of a national missile defense. Although a recent, widely publicized failure of a missile defense test casts into doubt the current timetable calling for President Clinton to make a decision this year on whether to commit to deploying a national defense system, the additional funds will allow BMDO to continue developing missile defense systems and to try to fix problems revealed in the recent test.

[The House approved the Defense bill conference report on July 19, and the Senate on July 27. President Clinton signed the bill into law on August 9, making the Defense bill only the second of the 13 FY 2001 appropriations bills to be signed into law] (the first, the Military Construction bill, also funds DOD programs). The substantial increases for DOD result from a bipartisan consensus that the defense budget needs to be increased substantially, and this consensus has made passage of the defense-related appropriations relatively easy and non-controversial. The remaining 11 bills covering domestic programs, however, will be much harder to get enacted because unlike the defense bills, Congress has allocated level funding or even cuts to them while President Clinton has insisted on large increases. Because of the large differences between the President and Congress over domestic spending priorities, the remaining bills may not get signed into law until late September or October.

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**Table A. Department of Defense by Program
House-Senate Conference on R&D in the FY 2001 Budget
(budget authority in millions of dollars)**

	FY 2000 Estimate	FY 2001 Request	House-Senate Conference				
			FY 2001 CONF.	Chg. from Request		Chg. from FY 2000	
				Amount	Percent	Amount	Percent
Research, Development, Test, and Evaluation:							
Basic Research ("6.1")	1,161	1,217	1,313	96	8.2%	152	13.1%
Applied Research ("6.2")	3,410	3,144	3,680	535	15.7%	269	7.9%
Total Research, or Tech. Base	4,571	4,362	4,993	631	13.8%	421	9.2%
Advanced Tech. Dev. ("6.3")	3,826	3,182	3,975	794	20.7%	149	3.9%
Total Science and Technology	8,397	7,543	8,968	1,425	17.0%	571	6.8%
Demonstration/Validation ("6.4")	6,524	6,810	7,817	1,008	15.4%	1,293	19.8%
Engineering and Manuf. Dev. ("6.5")	8,689	8,661	8,660	-1	0.0%	-29	-0.3%
RDT&E Management Support ("6.6")	2,552	2,434	2,620	186	7.3%	68	2.6%
Operational Systems Dev. ("6.7")	12,188	12,415	12,808	394	3.2%	621	5.1%
BA Adjustment	68	1	0	-1	-0.9%	--	--
TOTAL RDT&E	38,419	37,863	40,874	3,011	7.8%	2,455	6.4%
Other appropriations ¹	655	647	647	0	0.1%	-8	-1.2%
Medical research ²	270	66	415	349	129.3%	145	53.7%
Total DOD R&D	39,344	38,576	41,936	3,360	8.5%	2,592	6.6%

AAAS estimates based on FY 2001 appropriations bills. Includes conduct of R&D and R&D facilities.

FY 2000 and FY 2001 request figures based on OMB R&D data and supplemental agency budget data.

Figures are rounded to the nearest million. Changes calculated from unrounded figures.

FY 2000 figures adjusted to reflect rescissions and supplementals enacted in Public Law 106-246.

FY 2001 Conference figures are adjusted to reflect rescissions and supplementals, and are also reduced to reflect general reductions.

¹ R&D support in military personnel, military construction, and other DOD appropriations.

Includes chemical agents and munitions destruction R&D funded outside RDT&E.

² Medical research appropriated in Defense Health Programs, not RDT&E. These funds are not included in "6.2."

July 19, 2000 - House-Senate conference funding levels.

These funding levels are FINAL unless the bill is vetoed, or rescissions/supplementals are enacted in later appropriations bills.

**Table B. Department of Defense by Agency
House-Senate Conference on R&D in the FY 2001 Budget
(budget authority in millions of dollars)**

	FY 2000 Estimate	FY 2001 Request	FY 2001 CONF.	House-Senate Conference			
				Chg. from Request		Chg. from FY 2000	
				Amount	Percent	Amount	Percent
Research, development, test, and evaluation:							
Army	5,204	5,260	6,256	995	18.9%	1,052	20.2%
Navy	9,001	8,477	9,392	916	10.8%	391	4.3%
Air Force	14,487	13,686	13,956	270	2.0%	-531	-3.7%
Defense Agencies	9,431	10,238	11,043	805	7.9%	1,612	17.1%
<i>Defense Adv. Res. Projects Agcy.</i>	1,876	1,951	2,002	50	2.6%	125	6.7%
<i>Ballistic Missile Defense Org.</i>	3,428	3,943	4,205	261	6.6%	777	22.7%
<i>Other</i>	4,127	4,344	4,837	493	11.3%	710	17.2%
Director of Test and Evaluation	265	0	0	0	-	-265	-100.0%
Director of Operational Test & Eval.	31	202	227	26	12.7%	196	632.5%
TOTAL RDT&E	38,419	37,863	40,874	3,011	8.0%	2,455	6.4%
Other appropriations ¹	655	647	647	0	0.1%	-8	-1.2%
Medical research ²	270	66	415	349	528.8%	145	53.7%
Total DOD R&D	39,344	38,576	41,936	3,360	8.7%	2,592	6.6%

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